**Commonwealth of Massachusetts**
**Department of Telecommunications and Energy**
**Fitchburg Gas and Electric Light Company**
**Docket No. D.T.E. 02-24/25**
**Responses to the Attorney General's Fourth Set of Information Requests**

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**Request No. AG-4-1 (Electric)**
Please provide a complete copy of the depreciation study and workpapers used to determine the depreciation accrual rates currently being used by the Company, including all of the curve analyses for each plant account along with the resulting statistics. Please also provide the assumed average service life and net salvage value used to determine the existing accrual rates.

**Response:**
Please see Attachment AG-4-1 (Electric) for a copy of the last Depreciation Study used to determine the depreciation accrual rates for the Electric Division.

**Person Responsible:** James H. Aikman

# FITCHBURG GAS AND ELECTRIC LIGHT COMPANY

## *DEPRECIATION OF PROPERTY*

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## ORIGINAL COST AS OF DECEMBER 31, 1983

## MAY, 1984

united engineers
& constructors inc.
A Raytheon Company

# FITCHBURG GAS AND ELECTRIC LIGHT COMPANY

## DEPRECIATION OF PROPERTY

## ORIGINAL COST BASIS AS OF

## DECEMBER 31, 1983

Prepared by



May 1984

Responsible Engineer

DANIEL G. DONOGHUE

Project Manager/Department Manager

STEPHEN A. KOKOLSKI

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# FITCHBURG GAS AND ELECTRIC LIGHT COMPANY

## DEPRECIATION OF PROPERTY

## ORIGINAL COST AS OF DECEMBER 31, 1983

## I. SUMMARY

This report presents the results of the United Engineers & Constructors Inc. (UE&C) review of the annual depreciation requirements for the electric and gas properties of the Fitchburg Gas and Electric Light Company (Company). This study is based upon the original cost of property in service as of December 31, 1983, which includes the Company ownership of portions of the steam-electric generating units-New Haven Harbor Unit No. 1 and W. F. Wyman Unit No. 4.

As of December 31, 1983, the total original cost of plant-in-service was $47,293,308, up over 28 percent from our last Depreciation Review conducted as of December 31, 1975 and completed in February 1977. The investment in depreciable plant, the basis for our computations, is $46,065,776 the difference is the Company's investment in Land and Land Rights, Amortized Property and Intangible Plant. Sixty-seven percent of the total depreciable plant is invested in electric properties with the remaining thirty-three percent in gas properties.

The remaining life method was employed to calculate the annual depreciation expense for each primary plant account. This approach identifies the net undepreciated plant investment for each account and provides an equal annual depreciation amount to be recouped over the remaining life of the account. Functional group depreciation totals are obtained by the summation of all accounts in each function, while the summation of all functional group data in a property type identifies the annual depreciation expense for that property type.

The study results show that the annual depreciation expense, based on year-end plant in service, has been calculated to be $1,533,422 and yields an annual accrual percentage of 3.329. The composite annual depreciation expense calculation made using the elements of the year end rate but applying it on average plant in service yields $1,510,617. This last figure is comparable to the Company's posted annual depreciation expense for 1983 of $1,488,912, the proposed depreciation increase is $21,700.

The book depreciation reserve is $12,562,703, while the indicated reserve for depreciation has been calculated to be $13,648,135. UE&C considers this book reserve to be adequate, since the difference between booked and indicated reserves is less than one annual accrual.

As shown in Tables VII-2 and VII-4, the separate analyses of gas and electric plant in service identifies small differences between the presently utilized depreciation accrual rates and those calculated in this study. Since, however, reserve differences do exist in both property types, UE&C recommends that the composite annual accrual for electric plant remain at 3.337 percent rather than the calculated 3.192 percent, while the accrual rate for gas plant in service correspond to the results of this study. That would provide for an increase to 3.312 percent accrual for the gas plant versus the 3.167 composite annual percentage rate presently used.

Because property mix can change over time, rates of inflation vary and management forecasts may be altered to serve more updated needs, the results of the depreciation review should be reexamined within three to five years.

## II. PURPOSE AND SCOPE

This report presents the results of an original cost study made to provide an appropriate basis for book reserve re-allocation and determine the resulting annual depreciation expenses associated with the electric and gas plant capital investments of the Fitchburg Gas and Electric Light Company. The annual depreciation expense for each depreciable plant account was determined using the remaining life method. This method utilizes the original cost for each account, the net salvage estimate, the allocated book depreciation reserve, and, the statistically derived remaining life.

Depreciation is the concept whereby the original capital investment in a fixed asset is recovered over the productive life of the asset by annual expense provisions determined using an accepted accrual method. For a utility, the accrual method should correspond to the decrease of plant economic usefulness so that current rate tariffs include costs of capital recovery proportionate to the total plant required to service present customers.

The original cost upon which this report is based is specified for electric properties in the Fitchburg Gas & Electric Light Company's Federal Energy Regulatory Commission (FERC), Form No. 1 for the year ended December 31, 1983. The original cost source for the gas properties for the year ended December 31, 1983 is the Return of the Fitchburg Gas and Electric Light Company to the Department of Public Utilities of Massachusetts. Three Balance Sheet accounts identify the property under study, Account 101 - Utility Plant in Service; Account 106 - Completed Construction Not Classified; and, Account 107-Construction Work in Progress. The gas plant account designations used in this report are those prescribed by the Department of Public Utilities of Massachusetts in its Uniform System of Accounts for Gas Companies which went into effect on January 1, 1961.

The procedure most generally followed by the utility industry for the determination of depreciation requirements calls for the selection of a mortality dispersion curve (in most utility regulatory jurisdictions, an Iowa curve), average service live and net salvage percentage for each primary plant account. These elements are established after our consideration of pertinent factors such as the results of analyses of historical utility records; management plans concerning premature or unanticipated retirements; the impact of environmental regulations; observations obtained from an inspection of physical property; practices of the utility industry; and, our firm's experience in the depreciation field. All of these factors must be weighed in order to obtain the final selection of curve types, average service lives and net salvage percentages that might be expected to be maintained in the future.

Since many depreciation considerations are subjective, the measurement of depreciation cannot be thought of as an exact science. For this reason, good practice requires that the statistical analyses of historical experience be used as a guide and that the results of those analyses of historical experience be combined with judgements developed from other investigations to help identify the extent that future experience may deviate from the past.

# III. DEPRECIATION CONCEPTS

## A. Straight-Line Principles

In this Depreciation Review, our depreciation expense conclusions are premised on the straight-line method of recoupment. The basic principle of the straight-line method for determining depreciation for a unit of physical property is that the annual charges for depreciation are distributed uniformly over the estimated service life of the unit. The underlying assumption is that the condition of a unit is directly proportional to its years in service. As applied to a single unit of property, this would mean that the accumulated depreciation on the unit at any age would bear the same relationship to the cost of the unit as the unit's age bears to the estimated life of that unit.

The remaining life method refines the underlying assumption of straight-line methodology, which equates condition with age. Under this approach, the accumulated book depreciation is allocated to each plant account as of the study date, and the equal annual accrual to be recouped over the estimated remaining life of the account is determined. Each subsequent review of the Company's depreciation status revises the depreciation requirements based on changes in the Iowa mortality curves, average service lives, and net salvage percentages. The result is a monitoring process, which evaluates the accrued and annual depreciation provisions on a regular basis.

## B. Depreciation Terms and Techniques

Depreciation was determined in this study in accordance with the definitions appearing in the publications of the Department of Public Utilities of Massachusetts entitled, Uniform System of Accounts for Gas Companies and the Federal Energy Regulatory Commission policies as written in Title 18 in the Code of Federal Regulation in 18 CFR 101.

The relevant definitions obtained from the Massachusetts Department of Public Utilities are as follows:

(1) Depreciation

" 'Depreciation', as applied to depreciable utility plant, means the loss in service value not restored by current maintenance, incurred in connection with the consumption or prospective retirement of utility plant in the course of service from causes which are known to be in current operation and against which the utility is not protected by insurance. Among the causes to be given consideration are wear and tear, decay, action of the elements, inadequacy, obsolescense, changes in the art, changes in demand and requirements of public authorities."

(2) Service Value

" 'Service Value' means the difference between cost and the net salvage value of utility plant."

(3) Salvage Value

" 'Salvage Value' means the amount received for property retired, less any expenses incurred in connection with the sale or in preparing the property for sale, or, if retained, the amount at which the material recoverable is chargeable to materials and supplies, or other appropriate account."

(4) Cost of Removal

" 'Cost of Removal' means the cost of demolishing, dismantling, tearing down or otherwise removing utility plant, including the cost of transportation and handling incidental thereto."

(5) Service Life

" 'Service Life' means the time between the date utility plant is includible in utility plant in service or utility plant leased to others, and the date of its retirement. If depreciation is accounted for on a production basis rather than on a time basis, then service life should be measured in terms of the appropriate unit of production."

In our determination of depreciation, the "loss in service value" is equivalent to that portion of the original cost of plant in service which to date has been recouped by means of annual appropriations to the depreciation reserve. Thus, the book balance of the reserve for depreciation as of December 31, 1983 was established as the "loss in service value" of the plant.

Net salvage value is the difference between salvage value and cost of removal. When salvage value exceeds cost of removal, this difference is referred to as positive net salvage; and when the converse is true, the difference is referred to as negative net salvage.

It is impractical to consider individually the service life and net salvage value of every unit of property. Similar items of property are therefore grouped together and depreciation calculations are based on the average mortality characteristics of the group. Items which are not one of a kind or unique within the property system of the utility can be arranged by the group concept. A group can be a primary plant account, subaccount or functional group. In such a group, it is unlikely that all the individual units will be retired at the same age, but it is probable that some will be retired at ages less than the average service life and some at ages greater than the average service life.

Each group can have its depreciation requirements defined differently. To quantify these differences, a mathematical picture of the group is developed by assigning to it an average service life, an Iowa survivor curve, and a net salvage percentage. These three elements in conjunction with the aged plant for a group (surviving balances of prior years' gross additions) are the inputs required for the calculation of the accrued depreciation under the straight-line method.

C. Mortality Dispersion

Mortality dispersion is the probability distribution of retirements over a series of years. The shapes of curves of actual equipment-descriptive mortality dispersions often differ from the common bell-shaped or "normal" probability curve. As a result, studies have been made to derive more realistic mortality curves from empirical data to serve as interpolative models for curves developed from theoretical dispersions. Systems

of curves resulting from the studies, such as the "Iowa" curves, the "O-Type" curves, the "Gompertz-Makeham" curves, and the "H-Type" curves, provide a basis for comparative interpretation of data on actual mortality experience.

The Iowa curves were among the first to be systematically developed and are the most commonly used in the utility industry. Bulletin 125, published by the Iowa Engineering Experiment Station at Iowa State College describes the development of the basic types of survivor curves and their applicability to industrial properties having a wide range of mortality characteristics. (Mortality or retirement curves may be thought of as the complements of survivor curves.) The eighteen basic curves have been subsequently expanded to twenty-eight curves to provide more discrete gradations in the spectrum of possible retirement patterns. Since their publication, utility firms in particular have frequently used the Iowa curves for book depreciation calculations with the approval of most regulatory commissions. The curves have also been applied in computations for alternative tax depreciation considerations, economic proposals, rate of return studies, and in corporate computer modeling programs.

There are three separate groups, or families, of Iowa curves, each designated by the character of its modal (highest) retirement frequency: "L" for a left-moded curve, mode occurring at an age less than average life; and "S" for a symmetrical curve, mode occurring at an age equal to average life; and "R" for a right-moded curve, mode occurring at an age greater than average life. Further characteristics of these curves within a family of curves are identified by subscript numbers. Low subscripts indicate that a larger percentage of an original group of properties retires on an annual basis than is indicated for the higher subscripts. As a logical corollary, the modal frequency of retirements exhibited by the lower subscripted patterns at the modal age is not of as great a magnitude as for the higher subscripted patterns. Generally, low order patterns reflect greater retirement activity throughout life experience (broad dispersion), while

high order patterns reflect most retirement activity at modal ages in the area of average life (narrow dispersion). There are two mortality curves which effectively represent the extremes of the continuum of patterns. The SC pattern reflects a constant percentage of the original group retiring each year over a cycle extending to twice average life (straight-line horizontal retirement curve). The SQ pattern reflects zero retirements each year until average life when the entire original group retires (straight-line vertical retirement curve).

The principle of allocating depreciation at a constant straight-line rate over the remaining years of service, when applied in a manner reflecting the mortality dispersion inherent in a group of property, will result in the determination of depreciation consistent with the concept of recoupment of investment by the end of service life.

D. Statistical Analysis Methods Used in the Derivation of Historical Life Characteristics

1. General Discussion

The selection of mortality curves and average lives for groups of property is premised in part on historical retirement experience. In the past the utility industry attempted to determine unit life characteristics by employing simple statistical procedures. These early approaches offered greater refinement than the results theretofore obtained by estimates based on limited data or physical observation. The advantages of these procedures were that they were appropriate to the scarcity of the available accounting detail and the computations could be performed without excessive amounts of manpower, time, and cost. These methods are generally referred to as "turnover" methods.

As improved accounting records became available, modified actuarial procedures gained acceptance because the turnover methods based on incomplete accounting data produced results that were of limited value. With the increasing interest in the

depreciation field, statistical techniques were improved and new ones developed. Likewise, the utility industry in its adherence to regulatory requirements and upon recognition of the potential internal benefits installed property record systems. These new record systems supplied more detail than was previously available. This permitted the gathering of up-to-date information which provided more accurate representation of the utility's property history. These factors, coupled with the labor and time saving advantages supplied by computers, enabled the utilities to ultimately adopt statistical methods which provide historical life characteristics with greater validity.

The next sections describe techniques which were used in our analyses and are widely accepted by the utility industry and regulatory commissions for the determination of historical life characteristics.

2. Simulated Plant Record - Balances Method

The Simulated Plant Record - Balances Method is an approach which derives an estimated average service life for a property group by comparing and imitating the group's historical activity with what would be produced by using generalized survivor data. This method varies the average life for each of the twenty-eight Iowa curves represented by the ratio of expected survivors of sequential ages over a life cycle, until the sum of squared differences between simulated balances and book balances is found to be minimized. This method attempts to simulate the volume of retirements for each vintage group from initial installation through the test year.

The computation procedure for the Simulated Plant Record - Balances Method is as follows:

(a) Compute the indicated surviving balances for each year by applying the factors from one of the survivor dispersion patterns (as related to an originally estimated average life) to the gross additions.

(b) Obtain the sum of the indicated surviving balances, as of selected points in time, from the contributing vintage additions to produce "simulated plant balances"; i.e., those plant balances which would have existed had the account exactly followed the life dispersion pattern.

(c) Compute the least square differences between actual and simulated year-end balances.

(d) Check to determine if a minimum sum has been observed for the subject survivor dispersion pattern. If not, change the average life assumption and repeat the calculation procedure. If a minimum sum has been obtained, compute conformance and retirement indices.

(e) Compute rank based on above criteria.

Twenty separate simulated balances are calculated for each test. This procedure is followed for all Iowa dispersion patterns and numerous average life assumptions; the "best fit" among them is considered to be that mortality pattern and average life which best describes the group's history.

Two indices are calculated to provide perspective to the "best fit" results. The Conformance Index provided in our statistical computer analyses is important in the ultimate selection of the historical curve type and estimated average service life for the account under analysis. The Conformance Index is defined as the ratio of the average of the year-end balances of an account, in the years for which balance comparisons have been made, to the standard error of estimate. The standard error of estimate is defined as the square root of the mean squared deviation between the simulated and actual balances. The Retirement Index is the ratio of the accumulated statistical retirements of the first year's additions to the total survivors in the first year of account activity. It is useful in determining the projected mortality characteristics for an account. These two indices aid in eliminating erratic data based upon poor conformance or insufficient retirement history.

The input data used in these historical analyses required the collection of gross plant activity information from December 31, 1983 to the year of original installation for each account. This data was collected by the Company's plant accounting personnel from accounting records and then analyzed by UE&C.

The effort included the preparation of year-by-year schedules of gross additions, retirements, transfers, adjustments and year-end balances by plant account. This data was adjusted as necessary by restating account adjustments and transfers from the transaction year to the original year of capitalization. This procedure was required so that a record of each account could be established, which dates all additions and retirements to their original installation or termination from service.

3. Simulated Plant Record - Period Retirements Method

The Simulated Plant Record - Period Retirements Method was developed as a variant technique to liberate simulation analysis from the constraint of trying to simulate the total volume of retirements from the beginning of account history as a function of a single mortality pattern. It is known that an account may experience a shift in both mortality dispersion and average life characteristics over time, and, this shift may not be detected by simulating the entire history of an account.

The Simulated Plant Record - Period Retirements Method seeks to discover the mortality pattern and associated average life which most reliably simulates the annual retirement volumes experienced in a plant account during specified periods of time. By the use of such a specific period approach, indicated results are expected to more closely reflect current accounting policies, maintenance policies, equipment characteristics, and possible external economic factors.

The computation procedure for the Simulated Plant Record - Period Retirements Method is as follows:

(a) Compute the indicated retirement from each vintage gross addition by applying the retirement factors (differences between successive survivor factors) for one of the dispersion patterns as related to an originally estimated life.

(b) Obtain the sum of the appropriate retirements, as of selected points in time, from the contributing additions to produce annual "simulated plant retirements" for the period under study. These would be the annual plant retirements during the study period, had the account exactly followed the life-dispersion pattern.

(c) Compute the least square differences between actual and simulated yearly retirements.

(d) Check to determine if a minimum sum has been obtained for the subject survivor dispersion pattern. If not, change the average life assumption and repeat the calculation procedure until a sum more closely approaches zero. If a minimum sum has been obtained, compute the conformance and retirement indices.

(e) Compute rank based on above criteria.

After following this procedure for all dispersion patterns and average life assumptions, the "best fit" among them is considered to be the mortality pattern and average life which best describes the group's history.

This analysis method effectively finds the trend line generated by a life-dispersion pattern which satisfies the two prime criteria of trend line fittings:

(a) That the total volume of subjected data (retirements for a period) has been simulated by the function, and

(b) That the individual annual retirement volumes have been best approximated (the best simulating function has a minimum sum of squared deviations of all functions tried).

Again, Conformance and Retirement Indices provided in our statistical computer analysis guide our judgment in the elimination of unreasonable solutions based upon poor conformance or insufficient retirement history. In this case, the numerator of the Conformance Index ratio is the average yearly retirement of the years for which the comparisons have been made.

The input data requirements for this method of analysis are exactly the same as for the Simulated Plant Record - Balances Method.

E. Engineering, Managerial and Other Qualifying Considerations

Despite the best analytical assessments of historical experience, the past may be of limited value in projecting the future of plant investments. This limitation can be due to not having experienced the complete useful life-cycles of plant in service, or due to the effects of external economic pressures and financing considerations. Engineering

plans for retirement of specific plant investments coupled with the scheduling and the character of new plant investments influences the final interpretations of study indications. Additionally, knowledge of such plans aid in projecting probable future experience.

Accounting and financial policies will have affected past plant investment activity. Such policies can vary considerably from one utility to another and need to be known to fully understand any one utility's plant character. Among the facets of accounting and financial policy influencing historical data are the type and size of plant units currently and historically used, the manner of pricing retirements, the way in which plant adjustments are made, the timing of plant expansion plans, the age distribution of plant in service, and the methods of accounting for salvage and costs of removal. All of these elements affect any answer based on strict statistical analysis, and their evaluation can greatly improve the interpretation of statistical indications.

## IV. FIELD INSPECTION

In addition to the results and conclusions obtained from the analyses of accounting records, consideration of management's plans and industry practices, a further important criterion in the depreciation determination is the physical condition of the property under study. This can only be obtained by a field inspection. In this connection, a field inspection of the major facilities owned by the Company in the Fitchburg area was conducted by representatives of both United Engineers & Constructors Inc. and Fitchburg Gas and Electric Light Company. In addition, UE&C has ongoing work assignments for the Central Maine Power Company and the United Illuminating Company and has regularly inspected the production facilities at the Wyman Plant and the New Haven Harbor Facility.

Principal facilities inspected in the Fitchburg area by type of property, functional group and location included the following:

A. Electric Property

(1) Other Production Plant

Sawyer Passway, Fitchburg

(2) Transmission Plant

Flag Pond Substation, Fitchburg
Beech Street Substation, Fitchburg
Summer Street Substation, Fitchburg
Sawyer Passway, Fitchburg

(3) Distribution Plant

Wallace Road Substation, Fitchburg
Pleasant Street Substation, Lunenburg
River Street Substation, Fitchburg

B. Gas Property

(1) Production

Propane Air Peak Shaving Plant, Lunenburg

During the course of the field inspection of the specific property listed, other representative construction was also observed. This pertained to substantial investment included in the electric and gas property functional groups. It is estimated that the original cost of these observed facilities, when combined with the cost of the facilities located at the specific locations visited, represented a substantial portion of Fitchburg Gas and Electric Light Company's depreciable plant investment.

In addition to noting the condition of the property, attention was also given to identifying any property no longer used or useful and property physically retired but not removed from the books. This investigation disclosed that the appropriate adjustments have been made to the books for property falling into these categories.

The inspection revealed that the condition of the majority of the Company's facilities that were visited was excellent and that the housekeeping practices were excellent, also.

# V. SELECTION OF LIFE CHARACTERISTICS AND NET SALVAGE

To determine depreciation based on the age-life concept, an assignment of mortality characateristics and average lives for the various components of depreciable property must be made. Of equal importance is the assignment of future estimates of net salvage percentages. These assignments are accomplished after analizing historical records through statistical studies, collecting and analyzing salvage and cost of removal information, and estimating the effects of present-day managerial decisions on future plant experience. This section presents a discussion of these three elements, which help to form the judgement of the depreciation analyst.

## A. Curve Type and Average Life

Statistical studies were made to identify the historical life characteristics for each plant account that had sufficient data. (Accounts with life expectancies did not have historical analyses.) The Simulated Plant Record - Balances Method and the Simulated Plant Record - Period Retirements Method, both described in Section III, were the statistical techniques applied.

It must be emphasized that although statistical determinations of life characteristics based on analysis of past experience are useful guides, they should not be thought of as mathematically certain quantifications of the mortality dispersion and average life the existing plant will experience in the future. Therefore, in interpreting the results of the statistical studies, consideration was given to the present physical characteristics of the property, management's future plans, and to all general causes which might bring about retirement. Attention was also given to the interrelationship of the average lives of the various accounts, as well as to the current depreciation practices of the utility industry concerning each account.

The causes for the retirement of physical property may be classified generally into three main groups:

(1) Wear, which includes corrosion, erosion, decay, the action of water, and actual physical wear.

(2) Casualty, including fire and vandalism; natural causes such as lightning, flood, and tornado, and failure because of hidden defects.

(3) Economic causes, the major elements of which are changes in labor costs, improvements in design, changes in the economy, requirements of a public authority, obsolescence and inadequacy.

Wear, for a group of like units of identical quality that are subject to exactly the same conditions of service and maintenance, produces a symmetrical pattern of retirements with respect to the average life. That is, the number of retirements at ages less than average life will be equal to the number of retirements at ages greater than average life and the maximum rate of retirements will occur at the average life of the group. Since physical units are not physically identical, do not operate under exactly similar conditions, and are not given exactly the same maintenance, the distribution of retirements tends to occur in a broad band of years, but the pattern will still tend to be symmetrical if wear is the only cause for retirement. The other two causes of retirement, casualty and economic causes, tend to distort the distribution of retirements from the symmetrical pattern and may move the mode (year of maximum retirement) to an age less than or greater than average life.

The average service life and survivor curve were selected for each account after consideration of: the general causes of retirement, the results of our inspections, experience with similar properties, results of the Simulated Plant Record studies, future plans of the Company, and the exercise of prudent engineering judgments.

B. Net Salvage

A definition of net salvage appears in Section III. The derivation of a net salvage percentage involves the forecasting of salvage value and the cost of removal to be incurred upon the retirement of property comprising an account. Net salvage is shown as a percent of the original cost investment. Trends for certain types of property can be

observed where there has been some regular retirement activity and associated salvage and cost of removal. These trends can be used as a basis for estimating a prospective net salvage percentage. In our final estimate of net salvage, properties are assigned a percentage based upon ultimate disposal rather than an intermediate value based on reuse.

Our study considered all property that would generally be susceptible to net salvage. In instances where accounting records lent themselves to analysis, our determination of net salvage was influenced to a large degree by the results of such analyses. In addition, appropriate consideration was given to the results of recent studies for the Company, our experience with other utilities, policies followed by the industry in general, the Federal Power Commission publication FPC S-215, and the 1978-79 and 1982-83 AGA-EEI publications entitled "A Survey of Depreciation Statistics".

Records were available for the majority of the Company's plant accounts and the following statistical life analyses were conducted: year-by-year analyses for each account and weighted average rolling five-year bands by account. For some accounts salvage activity had not transpired to a measurable degree. Salvage percentages for these accounts were assigned strictly on the basis of our judgment after giving due consideration to the previously mentioned factors.

Where zero net salvage was assigned to accounts, it was done on the assumption that salvage receipts and cost of removal would cancel. Where it was believed that the cost of removal would exceed the salvage value of the retired property, negative net salvage was indicated.

The National Association of Regulatory Utility Commissioners (NARUC) in its book entitled Public Utility Depreciation Practices, December, 1968, devotes considerable attention to the subject of net salvage. The NARUC book, while written in a more favorable economic climate, emphasized the importance of maintaining detailed accounting records regarding salvage values and the costs of removal associated with retirements

in each class of depreciable plant; such documentation is valuable in forecasting future net salvage impact. The book also notes that salvage is as important as average service lives and mortality characteristics in the ultimate determination of annual depreciation rates. A trend indicated from salvage records in recent years had led the NARUC to conclude that "...the tendency for costs of removal to increase more rapidly than material prices has resulted in an increasing number of instances where average net salvage is estimated to be negative." As we have become involved in the recent high inflation years of the late 1970's and early 1980's, UE&C has found that there has been a significant trend to increasing net negative salvage.

The net salvage percentages determined are composite rates for each account as a whole. It should be stressed that the composite rates are not appropriate for the valuation of salvage of individual items of property included in any of the plant accounts appearing in the schedule.

The effects of the net salvage percentage assigned to each account are reflected both in the amounts calculated in our estimated accured depreciation used for allocating the book reserve and in the annual depreciation accrual requirements.

The schedules, commencing on Page V-6, present, by property type and by primary plant account, the curve types, average lives and net salvage percentages considered most appropriate for the properties of the Company.

C. Special Items

Discussions were held with the management and staff of the Company regarding the managerial, engineering, operating and other considerations which would influence the selection of curve types, average lives, and net salvage percentages for our determination of the depreciation requirements. We also attempted to identify those property items which should be treated individually rather than on a group basis. The introduction of known plans and actual past occurrences into this analysis results in a more accurate determination of depreciation requirements.

Based on our discussions, the following considerations have been incorporated in our study:

1. Assets capitalized in Account 342, Fuel Holders, Producers and Accessories, are utilized in conjunction with the leased jet unit. Since this lease agreement expires in 1998, those monies capitalized in Account 342 will be depreciated over a period corresponding to the remaining life of the lease, 15 years.
2. There is also a 1,200,000 gallon fuel holder and associated piping capitalized in Account 342 that will be retired in 1984. Therefore, this investment was assigned a life expectancy of 0.5 years.
3. The investment in the Rights-of-Way accounts for both gas and electric properties are included in the depreciable plant investments in this study.
4. The separate designation of utility plant called "Common Utility Plant" has been eliminated. The assets are properly recorded in the corresponding Electric and Gas Utility Plant categories.

FITCHBURG GAS AND ELECTRIC LIGHT COMPANY

DEPRECIATION OF PROPERTY
ORIGINAL COST AS OF DECEMBER 31, 1983

Summary of Survivor Curve, Average Life
and Net Salvage Percentage Estimates

ELECTRIC PROPERTY

| Account No. | Description | Survivor Curve Type | Average Life | Net Salvage Percentage |
|---|---|---|---|---|
| | STEAM PRODUCTION PLANT | | | |
| 311 | Structures and Improvements | SQ | 30 | (10) |
| 312 | Boiler Plant Equipment | SQ | 30 | (5) |
| 314 | Turbogenerator Units | SQ | 30 | (5) |
| 315 | Accessory Electric Equipment | SQ | 30 | 0 |
| 316 | Miscellaneous Power Plant Equipment | SQ | 30 | 0 |
| | OTHER PRODUCTION PLANT | | | |
| 342 | Fuel Holders, Producers and Accessories | LE | 15 | 0 |
| | TRANSMISSION PLANT | | | |
| 351 | Rights of Way | $S_{5.0}$ | 50 | 0 |
| 352 | Structures and Improvements | $S_{4.0}$ | 40 | (10) |
| 353 | Station Equipment | $R_{4.0}$ | 40 | 5 |
| 354 | Towers and Fixtures | $S_{5.0}$ | 50 | (10) |

FITCHBURG GAS AND ELECTRIC LIGHT COMPANY

DEPRECIATION OF PROPERTY
ORIGINAL COST AS OF DECEMBER 31, 1983

Summary of Survivor Curve, Average Life
and Net Salvage Percentage Estimates

ELECTRIC PROPERTY
(Continued)

| Account No. | Description | Survivor Curve Type | Average Life | Net Salvage Percentage |
|---|---|---|---|---|
| | TRANSMISSION PLANT (CONTINUED) | | | |
| 355 | Poles and Fixtures | $S_{5.0}$ | 35 | (5) |
| 356 | Overhead Conductors and Devices | $R_{1.0}$ | 35 | 0 |
| 357 | Underground Conduit | $S_{5.0}$ | 55 | (5) |
| 358 | Underground Conductors and Devices | $R_{5.0}$ | 50 | 10 |
| 359 | Roads and Trails | SQ | 50 | 0 |
| | DISTRIBUTION PLANT | | | |
| 361 | Structures and Improvements | $S_{4.0}$ | 50 | (5) |
| 362 | Station Equipment | $R_{4.0}$ | 35 | 10 |
| 364 | Poles, Towers and Fixtures | $R_{2.0}$ | 40 | (10) |
| 365 | Overhead Conductors and Devices | $R_{5.0}$ | 35 | (5) |
| 366 | Underground Conduit | $S_{6.0}$ | 60 | (5) |

FITCHBURG GAS AND ELECTRIC LIGHT COMPANY

DEPRECIATION OF PROPERTY
ORIGINAL COST AS OF DECEMBER 31, 1983

Summary of Survivor Curve, Average Life
and Net Salvage Percentage Estimates

ELECTRIC PROPERTY
(Continued)

| Account No. | Description | Survivor Curve Type | Average Life | Net Salvage Percentage |
|---|---|---|---|---|
| | DISTRIBUTION PLANT (CONTINUED) | | | |
| 367 | Underground Conductors and Devices | $S_{5.0}$ | 40 | (5) |
| 368 | Line Transformers | $R_{0.5}$ | 35 | 5 |
| 369 | Services | $S_{4.0}$ | 35 | (15) |
| 370 | Meters | $R_{4.0}$ | 35 | 0 |
| 371 | Installations on Customers' Premises | $R_{3.0}$ | 10 | 20 |
| 372 | Leased Property on Customers' Premises | $L_{2.0}$ | 10 | 25 |
| 373 | Street Lighting and Signal Systems | $R_{2.0}$ | 25 | (10) |
| | GENERAL PLANT | | | |
| 390 | Structures and Improvements | $R_{1.5}$ | 40 | (5) |
| 391 | Office Furniture and Equipment | $S_{3.0}$ | 15 | 10 |
| 392 | Transportation Equipment | $R_{1.0}$ | 10 | 25 |

FITCHBURG GAS AND ELECTRIC LIGHT COMPANY

DEPRECIATION OF PROPERTY
ORIGINAL COST AS OF DECEMBER 31, 1983

Summary of Survivor Curve, Average Life
and Net Salvage Percentage Estimates

ELECTRIC PROPERTY
(Continued)

| Account No. | Description | Survivor Curve Type | Average Life | Net Salvage Percentage |
|---|---|---|---|---|
| | GENERAL PLANT (Continued) | | | |
| 393 | Stores Equipment | $S_{3.0}$ | 25 | 5 |
| 394 | Tools, Shop and Garage Equipment | $R_{2.0}$ | 35 | 5 |
| 395 | Laboratory Equipment | $R_{3.0}$ | 35 | 5 |
| 396 | Power Operated Equipment | $R_{1.0}$ | 20 | 10 |
| 397 | Communication Equipment | $S_{4.0}$ | 15 | 10 |
| 398 | Miscellaneous Equipment | $R_{4.0}$ | 35 | 5 |

FITCHBURG GAS AND ELECTRIC LIGHT COMPANY

DEPRECIATION OF PROPERTY
ORIGINAL COST AS OF DECEMBER 31, 1983

Summary of Survivor Curve, Average Life
and Net Salvage Percentage Estimates

GAS PROPERTY

| Account No. | Description | Survivor Curve Type | Average Life | Net Salvage Percentage |
|---|---|---|---|---|
| | PRODUCTION PLANT | | | |
| 305 | Structures and Improvements | $S_{5.0}$ | 50 | (15) |
| 311 | Liquified Petroleum Gas Equipment | $R_{4.0}$ | 25 | 25 |
| 320 | Other Equipment | $L_{3.0}$ | 20 | 25 |
| | TRANSMISSION AND DISTRIBUTION PLANT | | | |
| 365.2 | Rights of Way | $R_{3.0}$ | 70 | 0 |
| 366 | Structures and Improvements | $S_{5.0}$ | 40 | (10) |
| 367 | Mains | $R_{3.0}$ | 70 | (10) |
| 369 | Measuring and Regulating Station Equipment | $S_{3.0}$ | 35 | 0 |
| 380 | Services | $R_{4.0}$ | 45 | (20) |
| 381 | Meters | $R_{4.0}$ | 40 | 0 |
| 382 | Meter Installations | $R_{3.0}$ | 45 | (10) |
| 383 | House Regulators | $S_{1.0}$ | 35 | 0 |
| 386 | Other Property on Customers' Premises | $R_{2.0}$ | 10 | 25 |

FITCHBURG GAS AND ELECTRIC LIGHT COMPANY

DEPRECIATION OF PROPERTY
ORIGINAL COST AS OF DECEMBER 31, 1983

Summary of Survivor Curve, Average Life
and Net Salvage Percentage Estimates

GAS PROPERTY
(Continued)

| Account No. | Description | Survivor Curve Type | Average Life | Net Salvage Percentage |
|---|---|---|---|---|
| | GENERAL PLANT | | | |
| 390 | Structures and Improvements | $R_{1.5}$ | 40 | (5) |
| 391 | Office Furniture and Equipment | $S_{3.0}$ | 15 | 10 |
| 392 | Transportation Equipment | $R_{1.0}$ | 10 | 25 |
| 393 | Stores Equipment | $S_{3.0}$ | 25 | 5 |
| 394 | Tools, Shop and Garage Equipment | $R_{2.0}$ | 35 | 5 |
| 395 | Laboratory Equipment | $R_{3.0}$ | 35 | 5 |
| 396 | Power Operated Equipment | $R_{1.0}$ | 20 | 10 |
| 397 | Communication Equipment | $S_{4.0}$ | 15 | 10 |
| 398 | Miscellaneous Equipment | $R_{4.0}$ | 35 | 5 |

# VI. DETERMINATION OF ACCRUED AND ANNUAL DEPRECIATION REQUIREMENTS

## A. Indicated Accrued Depreciation

A mortality dispersion curve represents a series of "death" probabilities with respect to time that is a characteristic of a retirement pattern of original properties in a primary plant account. The related survivor curve is a set of probabilities of survival at discrete ages over the total life of the final survivor in an account.

After determining the historical mortality patterns for each plant account and after considering present circumstances and future expectations, one pattern is selected to best describe the projected future behavior for each account. This pattern is crucial to the calculation of depreciation requirements as it provides an estimate of both the expected average service life and the expected average remaining service life of the survivors in the account, as functions of the entire life-cycle pattern.

The assignment of an average service life, net salvage percentage, and survivor pattern to surviving property allows the calculation of the indicated accrued depreciation reserve. This reserve is the depreciation that would have been accured as of the study date had the mortality dispersion, net salvage, and average life information presently available been known at the original dates of capitalization. Any time significant changes in average life or net salvage occur in accounts which represent a major percentage of total investment, the indicated depreciation reserve deviates from its past relationship to the book reserve. This deviation is directly attributable to the revised average life and net salvage changes. (Iowa curve changes do not significantly affect the indicated depreciation reserve.) For this reason, the indicated book reserve is no longer as reliable a measure of book depreciation as it was in the past, however, it does provide a basis for allocating book reserves to each account.

In order to make the indicated accrued depreciation reserve calculation for

each primary plant account, the surviving plant balances in service must be identified by year of capitalization. These data are maintained by the Company for all plant accounts and that information was made available to us for this study. For these dated survivors, each vintage has a particular status with respect to its expected future accruals, and hence, its present indicated reserve requirement. Accrued depreciation percentages, which may be referred to as reserve ratio factors, are developed from the life characteristics and are multiplied by the appropriate surviving balances (by vintages) to determine the reserve requirement for each vintage. The sum of these products for all survivors for all vintages is the indicated accrued depreciation reserve.

For those Special Items discussed in Section V, that had known retirement dates, the indicated accrued depreciation was calculated using the age-life basis without mortality dispersion.

Since the indicated accrued depreciation reserve by primary plant account provided the basis for the allocation of the Company's book depreciation reserve to each account, the result of this allocation became a key factor in the annual depreciation computation.

B. Indicated Annual Depreciation

The indicated annual depreciation expense was calculated using the straight-line remaining life method. The indicated annual accrual expense is referenced to year-end 1983 so that appropriate accrual percentages can be calculated based on audited original cost amounts.

The future depreciation accrual rates are based upon the Iowa survivor curve and average service life assigned to each account. These two elements define the theoretical depreciation reserve and are used to calculate the remaining life for each account. The original cost adjusted for salvage less the allocated book depreciation reserve is divided by the statistically derived remaining life to determine the depreciation expense for each account.

The depreciation expense associated with items 1 and 2 included in Special Items, discussed in Section V, is based on the life expectancy of each vintage comprising that account.

The remaining life approach permits depreciating the variations between the book depreciation reserve and the indicated depreciation reserve on a consistent basis.

# VII. RESULTS AND RECOMMENDATIONS

## A. Results

The results of our study of depreciation requirements for the Fitchburg Gas and Electric Light Company are summarized as of December 31, 1983 in Table VII-1 at Page 7-4. This table presents the summary of original cost of total plant in service, total book reserve, and the composite annual depreciation expense as recommended in this study. Detailed results depicting the allocated book reserve by property type, functional group and plant account appear in Tables VII-2 and VII-4.

The original cost, as posted in the Company's 1983 Report to the FERC and to the Department of Public Utilities of Massachusetts is reflected in total in Table VII-1. Table VII-5 reconciles the amounts capitalized in the electric depreciable plant accounts to the dollars utilized as a basis for this study.

The indicated accrued depreciation reserve for each plant account was used as the basis for allocating the Company's book reserve. The annual accrual percentage shown for each account in Tables VII-2 (Electric) and VII-4 (Gas), provides our estimate of the original cost investment, which should be recouped on a year-by-year basis while this study is in effect. This percentage is developed relative to the 1983 year-end plant in service. Our premise is that an account's retirements will follow the life and mortality dispersion pattern selected in this study and that expected net salvage will be realized.

Table VII-2 shows our study results for Electric Plant with both our study results and our recommendation of accrual rates consistent with the rate booked by the Company in 1983. (However, we do suggest changes in the functional group composite rates and individual plant accounts as reflected in this table. These revisions are based on the findings of our study).

The Table of Subaccounts, Table VII-3, depicts Account 342 which was labeled a special item due to investment related to the leased jet unit and dollars related to the 1984 retirement of a 1.2 million gallon tank and associated piping.

Table VII-1 shows the Company book reserve for 1983 to be $12,564,703 and the theoretical reserve to be $13,648,135. The annual depreciation amount recommended by UE&C is $1,533,422 resulting in a composite annual depreciation requirement of 3.329 percent based on year-end plant in service. Relating the electric and gas plant annual depreciation rate to average plant in service yields $1,510,617 and this may be compared to the Company's annual amount of $1,488,912 posted in its 1983 return to the Massachusetts Department of Public Utilities.

The indicated annual accrual amount, as it applies to the total Company property, is a composite percentage. This composite percentage has been derived by application of individual percentages to the plant accounts comprising the Company's combined depreciable property. Each percentage, as selected for an individual plant account is considered to be the most appropriate for the property and conditions known to us as of the study period.

Table VII-1 also shows the Company's book reserve for two property types as follows: Electric Property - $9,730,050 and Gas Property - $2,834,653. The annual depreciation expense based on year-end plant investment for the Electric Property is $1,030,476 resulting in a composite annual depreciation percent of 3.337.

The annual depreciation expense based on the year-end investment of the Gas Property is $502,946 and results in a composite annual depreciation percentage of 3.312.

B. Recommendations

It is recommended that the Company increase its current depreciation rates in gas plant to be comparable to those derived in this study. With respect to electric plant, we recommend that no change be implemented in the accrual rate. These electric plant study results show that changes in curves, lives, and net salvage have caused a slight reduction in the electric accrual rates recommended in our previous study dated February 1977. However, since the difference between booked reserve and indicated reserve maintains, we believe that no change should occur.

We recommend that the Company book its depreciation reserve by functional group consistent with the findings of this Depreciation Review and eliminate the Common plant property category. (This reserve has been proportionately allocated to the Company's electric and gas operations).

We also recommend that periodic reviews of depreciation requirements be conducted in order to maintain a surveillance on a current basis of any significant changes in life characteristics of the property. As an aid, it is suggested that the Company continue to maintain its plant, salvage and cost of removal records in such fashion that depreciation study data can be readily extracted. Results of these reviews, weighted by consideration of changes in accounting and engineering practices, changes in regulatory requirements, and such other factors as changes in the art, will provide the data to detect revisions in annual depreciation rates.

# FITCHBURG GAS AND ELECTRIC LIGHT COMPANY
## DEPRECIATION OF PROPERTY
## ORIGINAL COST AS OF DECEMBER 31, 1983

| Plant Investment | Adjusted Original Cost | Book Depreciation | | Indicated Accrued Depreciation | | Annual Depreciation | |
|---|---|---|---|---|---|---|---|
| | | Amount | Percent | Amount | Percent | Amount | Percent |
| Electric Plant | | | | | | | |
| Depreciable Plant | $ 30,880,301 | $ 9,730,050 | 31.5 | $ 9,942,148 | 32.2 | $ 1,030,476 | 3.337 |
| Non-Depreciable Plant | 1,063,506 | | | | | | |
| **Total Electric Plant** | $ 31,943,807 | | | | | | |
| Gas Plant | | | | | | | |
| Depreciable Plant | $ 15,185,475 | 2,834,653 | 18.7 | 3,705,987 | 24.4 | 502,946 | 3.312 |
| Non-Depreciable Plant | 164,026 | | | | | | |
| **Total Gas Plant** | $ 15,349,501 | | | | | | |
| **UTILITY PROPERTY** | | | | | | | |
| **Depreciable Plant** | **$ 46,065,776** | **$ 12,564,703** | **27.3** | **$ 13,648,135** | **29.6** | **$ 1,533,422** | **3.329** |
| **Non-Depreciable Plant** | **$ 1,227,532** | | | | | | |
| **TOTAL UTILITY PROPERTY** | **$ 47,293,308** | | | | | | |

FITCHBURG GAS + ELECTRIC LIGHT COMPANY

ELECTRIC PLANT

TABLE VII-2
SHEET 1 of 3

DEPRECIATION OF PROPERTY
ORIGINAL COST BASIS AS OF DECEMBER 31, 1983

ORIGINAL COST, BOOK DEPRECIATION, INDICATED ACCRUED AND ANNUAL DEPRECIATION REQUIREMENTS
SUMMARY BY ACCOUNTS

| ACCOUNT NUMBER | ACCOUNT DESCRIPTION | ORIGINAL COST | BOOK DEPRECIATION AMOUNT | BOOK DEPRECIATION PERCENT | INDICATED ACCRUED DEPRECIATION AMOUNT | INDICATED ACCRUED DEPRECIATION PERCENT | INDICATED ANNUAL DEPRECIATION AMOUNT | INDICATED ANNUAL DEPRECIATION PERCENT | RECOMMENDED ANNUAL DEPRECIATION AMOUNT | RECOMMENDED ANNUAL DEPRECIATION PERCENT |
|---|---|---|---|---|---|---|---|---|---|---|
| | PRODUCTION PLANT | | | | | | | | | |
| 311 | STRUCTURES AND IMPROVEMENTS | $ 863921 | $ 222144 | 25.71 | $ 227597 | 26.34 | $ 31937 | 3.697 | 33429 | 3.869 |
| 312 | BOILER PLANT EQUIPMENT | 3915821 | 970956 | 24.80 | 994790 | 25.40 | 138355 | 3.533 | 144819 | 3.698 |
| 314 | TURBOGENERATOR UNITS | 1615778 | 409076 | 25.32 | 419118 | 25.94 | 56969 | 3.526 | 59630 | 3.690 |
| 315 | ACCESSORY ELECTRIC EQUIPMENT | 639198 | 154717 | 24.20 | 158515 | 24.80 | 21437 | 3.354 | 22438 | 3.510 |
| 316 | MISCELLANEOUS POWER PLANT EQUIPMENT | 87757 | 20437 | 23.29 | 20939 | 23.86 | 2953 | 3.365 | 3091 | 3.522 |
| 342 | FUEL HOLDERS, PRODUCERS AND ACCESSORIES | 260003 | 224148 | 86.21 | 224148 | 86.21 | 8065 | 3.102 | 8065 | 3.102 |
| | TOTAL DEPRECIABLE PRODUCTION PLANT | $ 7382478 | $ 2001478 | 27.11 | $ 2045107 | 27.70 | $ 259716 | 3.518 | 271472 | 3.677 |
| 310 | LAND AND LAND RIGHTS | $ 241772 | | | | | | | | |
| 343 | PRIME MOVERS | $ 9670 | | | | | | | | |
| | TOTAL PRODUCTION PLANT | $ 7633920 | | | | | | | | |
| | TRANSMISSION PLANT | | | | | | | | | |
| 351 | CLEARING LAND AND RIGHTS OF WAY | $ 189369 | $ 54521 | 28.79 | $ 55716 | 29.42 | $ 3953 | 2.035 | 4027 | 2.127 |
| 352 | STRUCTURES AND IMPROVEMENTS | 80416 | 20470 | 25.46 | 20916 | 26.01 | 2229 | 2.772 | 2330 | 2.854 |
| 353 | STATION EQUIPMENT | 3736078 | 820040 | 21.95 | 837915 | 22.43 | 102219 | 2.736 | 106846 | 2.860 |
| 354 | TOWERS AND FIXTURES | 78108 | 22838 | 29.24 | 23336 | 29.88 | 1733 | 2.219 | 1811 | 2.319 |
| 355 | POLES AND FIXTURES | 1699475 | 600058 | 35.31 | 613138 | 36.08 | 51425 | 3.030 | 53826 | 3.167 |
| 356 | OVERHEAD CONDUCTORS AND DEVICES | 769620 | 204570 | 26.58 | 209029 | 27.16 | 22159 | 2.879 | 23162 | 3.010 |
| 357 | UNDERGROUND CONDUIT | 15001 | 12802 | 85.34 | 13081 | 87.20 | 317 | 2.113 | 331 | 2.207 |
| 358 | UNDERGROUND CONDUCTORS AND DEVICES | 250709 | 144363 | 57.58 | 147510 | 58.84 | 4698 | 1.874 | 4911 | 1.959 |
| 359 | ROADS AND TRAILS | 10032 | 2126 | 21.19 | 2172 | 21.65 | 202 | 2.014 | 211 | 2.103 |
| | TOTAL DEPRECIABLE TRANSMISSION PLANT | $ 6828808 | $ 1881794 | 27.56 | $ 1922813 | 28.16 | $ 188905 | 2.766 | $ 197455 | 2.891 |
| 350 | LAND AND LAND RIGHTS | $ 698060 | | | | | | | | |
| | TOTAL TRANSMISSION PLANT | $ 7526868 | | | | | | | | |

VII-5

FITCHBURG GAS + ELECTRIC LIGHT COMPANY

ELECTRIC PLANT

TABLE VII-2
SHEET 2 of 3

DEPRECIATION OF PROPERTY
ORIGINAL COST BASIS AS OF DECEMBER 31, 1983

ORIGINAL COST, BOOK DEPRECIATION, INDICATED ACCRUED AND ANNUAL DEPRECIATION REQUIREMENTS
SUMMARY BY ACCOUNTS

| ACCOUNT NUMBER | ACCOUNT DESCRIPTION | ORIGINAL COST | BOOK DEPRECIATION AMOUNT | BOOK DEPRECIATION PERCENT | INDICATED ACCRUED DEPRECIATION AMOUNT | INDICATED ACCRUED DEPRECIATION PERCENT | INDICATED ANNUAL DEPRECIATION AMOUNT | INDICATED ANNUAL DEPRECIATION PERCENT | RECOMMENDED ANNUAL DEPRECIATION AMOUNT | RECOMMENDED ANNUAL DEPRECIATION PERCENT |
|---|---|---|---|---|---|---|---|---|---|---|
| | DISTRIBUTION PLANT | | | | | | | | | |
| 361 | STRUCTURES AND IMPROVEMENTS | $ 257094 | $ 125692 | 48.89 | $ 128432 | 49.96 | $ 5506 | 2.142 | 5755 | 2.238 |
| 362 | STATION EQUIPMENT | 2340970 | 991034 | 42.33 | 1012637 | 43.26 | 61310 | 2.619 | 64085 | 2.738 |
| 364 | POLES, TOWERS AND FIXTURES | 2099285 | 588115 | 28.02 | 600935 | 28.63 | 58145 | 2.770 | 60777 | 2.895 |
| 365 | OVERHEAD CONDUCTORS AND DEVICES | 3498469 | 1249449 | 35.71 | 1276684 | 36.49 | 106313 | 3.039 | 111124 | 3.176 |
| 366 | UNDERGROUND CONDUIT | 605424 | 255552 | 42.21 | 261123 | 43.13 | 10739 | 1.774 | 11225 | 1.854 |
| 367 | UNDERGROUND CONDUCTORS AND DEVICES | 948019 | 391060 | 41.25 | 399585 | 42.15 | 25287 | 2.667 | 26432 | 2.789 |
| 368 | LINE TRANSFORMERS | 2461737 | 519141 | 21.09 | 530458 | 21.55 | 67141 | 2.727 | 70180 | 2.851 |
| 369 | SERVICES | 995734 | 483615 | 48.57 | 494157 | 49.63 | 33240 | 3.338 | 34745 | 3.489 |
| 370 | METERS | 1105341 | 439014 | 39.72 | 448584 | 40.58 | 32035 | 2.898 | 33485 | 3.029 |
| 371 | INSTALLATIONS ON CUSTOMERS# PREMISES | 391626 | 141545 | 36.14 | 144630 | 36.93 | 31907 | 8.122 | 33247 | 8.489 |
| 372 | LEASED PROPERTY ON CUSTOMERS# PREMISES | 289545 | 83733 | 28.92 | 85558 | 29.55 | 21873 | 7.554 | 22863 | 7.896 |
| 373 | STREET LIGHTING AND SIGNAL SYSTEMS | 819041 | 305737 | 37.33 | 312402 | 38.14 | 36516 | 4.458 | 38169 | 4.660 |
| | TOTAL DEPRECIABLE DISTRIBUTION PLANT | $ 15812285 | $ 5573687 | 35.25 | $ 5695185 | 36.02 | $ 489912 | 3.098 | $512087 | 3.239 |
| 360 | LAND AND LAND RIGHTS | $ 66618 | | | | | | | | |
| | TOTAL DISTRIBUTION PLANT | $ 15878903 | | | | | | | | |

FITCHBURG GAS + ELECTRIC LIGHT COMPANY

ELECTRIC PLANT

TABLE VII-2
SHEET 3 of 3

DEPRECIATION OF PROPERTY
ORIGINAL COST BASIS AS OF DECEMBER 31, 1983

ORIGINAL COST, BOOK DEPRECIATION, INDICATED ACCRUED AND ANNUAL DEPRECIATION REQUIREMENTS
SUMMARY BY ACCOUNTS

| ACCOUNT NUMBER | ACCOUNT DESCRIPTION | ORIGINAL COST | BOOK DEPRECIATION AMOUNT | BOOK DEPRECIATION PERCENT | INDICATED ACCRUED DEPRECIATION AMOUNT | INDICATED ACCRUED DEPRECIATION PERCENT | INDICATED ANNUAL DEPRECIATION AMOUNT | INDICATED ANNUAL DEPRECIATION PERCENT | RECOMMENDED ANNUAL DEPRECIATION AMOUNT | RECOMMENDED ANNUAL DEPRECIATION PERCENT |
|---|---|---|---|---|---|---|---|---|---|---|
| | GENERAL PLANT | | | | | | | | | |
| 390 | STRUCTURES AND IMPROVEMENTS | $ 112755 | $ 15434 | 13.69 | $ 15770 | 13.99 | $ 2967 | 2.631 | 3101 | 2.750 |
| 391 | OFFICE FURNITURE AND EQUIPMENT | 188816 | 67292 | 35.64 | 68759 | 36.42 | 11533 | 6.108 | 12055 | 6.385 |
| 392 | TRANSPORTATION EQUIPMENT | 331593 | 118573 | 35.76 | 121157 | 36.54 | 25514 | 7.694 | 26669 | 8.043 |
| 393 | STORES EQUIPMENT | 16110 | 8256 | 51.25 | 8436 | 52.36 | 629 | 3.904 | 657 | 4.078 |
| 394 | TOOLS, SHOP AND GARAGE EQUIPMENT | 66317 | 19237 | 29.01 | 19656 | 29.64 | 1816 | 2.738 | 1898 | 2.862 |
| 395 | LABORATORY EQUIPMENT | 48116 | 11317 | 23.52 | 11564 | 24.03 | 1318 | 2.739 | 1378 | 2.864 |
| 396 | POWER OPERATED EQUIPMENT | 24861 | 12047 | 48.46 | 12310 | 49.52 | 1148 | 4.618 | 1200 | 4.827 |
| 397 | COMMUNICATION EQUIPMENT | 13777 | 4047 | 29.38 | 4135 | 30.01 | 835 | 6.061 | 873 | 6.337 |
| 398 | MISCELLANEOUS EQUIPMENT | 54385 | 16888 | 31.05 | 17256 | 31.73 | 1560 | 2.868 | 1631 | 2.999 |
| | TOTAL DEPRECIABLE GENERAL PLANT | $ 856730 | $ 273091 | 31.88 | $ 279043 | 32.57 | $ 47320 | 5.523 | $ 49462 | 5.773 |
| 391 | NONDEPRECIABLE OFFICE | $ 47386 | | | | | | | | |
| | TOTAL GENERAL PLANT | $ 904116 | | | | | | | | |
| | TOTAL DEPRECIABLE PROPERTY ANALYZED | $ 30880301 | $ 9730050 | 31.51 | $ 9942148 | 32.20 | $ 985853 | 3.192 | $ 1030476 | 3.337 |
| | | 30,548,706 | | | | | | | 1003807 | 3.286 |

FITCHBURG GAS + ELECTRIC LIGHT COMPANY

ELECTRIC PLANT

TABLE VII-3
SHEET 1 of 1

DEPRECIATION OF PROPERTY
ORIGINAL COST BASIS AS OF DECEMBER 31, 1983

ORIGINAL COST, BOOK DEPRECIATION, INDICATED ACCRUED AND ANNUAL DEPRECIATION REQUIREMENTS
SUMMARY BY SUBACCOUNTS

| ACCOUNT NUMBER | ACCOUNT DESCRIPTION | ORIGINAL COST | BOOK DEPRECIATION AMOUNT | BOOK DEPRECIATION PERCENT | INDICATED ACCRUED DEPRECIATION AMOUNT | INDICATED ACCRUED DEPRECIATION PERCENT | INDICATED ANNUAL DEPRECIATION AMOUNT | INDICATED ANNUAL DEPRECIATION PERCENT | RECOMMENDED ANNUAL DEPRECIATION AMOUNT | RECOMMENDED ANNUAL DEPRECIATION PERCENT |
|---|---|---|---|---|---|---|---|---|---|---|
| 342 | FUEL HOLDERS, PRODUCERS AND ACCESSORIES | | | | | | | | | |
| | .5 YEAR LIFE EXPECTANCY | $ 198295 | $ 192215 | 96.93 | $ 192215 | 96.93 | $ 6080 | 3.066 | 6080 | 3.066 |
| | 15 YEAR LIFE EXPECTANCY | 61708 | 31933 | 51.75 | 31933 | 51.75 | 1985 | 3.217 | 1985 | 3.217 |
| | TOTAL ACCOUNT 342 | $ 260003 | $ 224148 | 86.21 | $ 224148 | 86.21 | $ 8065 | 3.102 | $ 8065 | 3.102 |

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GAS PLANT

TABLE VII-4
SHEET 1 of 3

DEPRECIATION OF PROPERTY
ORIGINAL COST BASIS AS OF DECEMBER 31, 1983

ORIGINAL COST, BOOK DEPRECIATION, INDICATED ACCRUED AND ANNUAL DEPRECIATION REQUIREMENTS
SUMMARY BY ACCOUNTS

| ACCOUNT | | | BOOK DEPRECIATION | | INDICATED ACCRUED DEPRECIATION | | INDICATED ANNUAL DEPRECIATION | |
|---|---|---|---|---|---|---|---|---|
| NUMBER | DESCRIPTION | ORIGINAL COST | AMOUNT | PERCENT | AMOUNT | PERCENT | AMOUNT | PERCENT |
| | INTANGIBLE PLANT | | | | | | | |
| 301 | ORGANIZATION | $ 36387 | | | | | | |
| | TOTAL INTANGIBLE PLANT | $ 36387 | | | | | | |
| | PRODUCTION PLANT | | | | | | | |
| 305 | STRUCTURES + IMPROVEMENTS | $ 61654 | $ 15229 | 24.70 | $ 19910 | 32.29 | $ 1546 | 2.508 |
| 311 | PETROLEUM GAS EQUIPMENT | 684968 | 199003 | 29.05 | 260174 | 37.98 | 25587 | 3.736 |
| 320 | OTHER EQUIPMENT | 53207 | 1690 | 3.18 | 2210 | 4.15 | 2022 | 3.800 |
| | TOTAL DEPRECIABLE PRODUCTION PLANT | $ 799829 | $ 215922 | 27.00 | $ 282294 | 35.29 | $ 29155 | 3.645 |
| 304 | LAND AND LAND RIGHTS | $ 88990 | | | | | | |
| | TOTAL PRODUCTION PLANT | $ 888819 | | | | | | |
| | STORAGE PLANT | | | | | | | |
| 360 | LAND AND LAND RIGHTS | $ 1033 | | | | | | |
| | TOTAL STORAGE PLANT | $ 1033 | | | | | | |

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GAS PLANT

TABLE VII-4
SHEET 2 of 3

DEPRECIATION OF PROPERTY
ORIGINAL COST BASIS AS OF DECEMBER 31, 1983

ORIGINAL COST, BOOK DEPRECIATION, INDICATED ACCRUED AND ANNUAL DEPRECIATION REQUIREMENTS
SUMMARY BY ACCOUNTS

| ACCOUNT NUMBER | DESCRIPTION | ORIGINAL COST | BOOK DEPRECIATION AMOUNT | BOOK DEPRECIATION PERCENT | INDICATED ACCRUED DEPRECIATION AMOUNT | INDICATED ACCRUED DEPRECIATION PERCENT | INDICATED ANNUAL DEPRECIATION AMOUNT | INDICATED ANNUAL DEPRECIATION PERCENT |
|---|---|---|---|---|---|---|---|---|
| | TRANSMISSION AND DISTRIBUTION | | | | | | | |
| 365.2 | RIGHTS OF WAY | $ 14911 | $ 1789 | 12.00 | $ 2339 | 15.69 | $ 222 | 1.489 |
| 366 | STRUCTURES AND IMPROVEMENTS | 37985 | 15888 | 41.83 | 20772 | 54.68 | 1288 | 3.391 |
| 367 | MAINS | 6558504 | 1131082 | 17.25 | 1478761 | 22.55 | 109215 | 1.665 |
| 369 | MEASURING AND REGULATING STATION EQUIPMENT | 290160 | 56467 | 19.46 | 73824 | 25.44 | 8954 | 3.086 |
| 380 | SERVICES | 3312205 | 655274 | 19.78 | 856697 | 25.86 | 94033 | 2.839 |
| 381 | METERS | 669367 | 152814 | 22.83 | 199787 | 29.85 | 18383 | 2.746 |
| 382 | METER INSTALLATIONS | 568563 | 71130 | 12.51 | 92995 | 16.36 | 14472 | 2.545 |
| 383 | HOUSE REGULATORS | 59384 | 12754 | 21.48 | 16674 | 28.08 | 1850 | 3.115 |
| 386 | OTHER PROPERTY ON CUSTOMERS PREMISES | 2468413 | 430447 | 17.14 | 562760 | 22.80 | 202980 | 8.223 |
| | TOTAL DEPRECIABLE TRANSMISSION AND DISTRIBUTION | $ 13979492 | $ 2527645 | 18.08 | $ 3304609 | 23.64 | $ 451397 | 3.229 |
| 365.1 | LAND AND LAND RIGHTS | $ 11421 | | | | | | |
| | TOTAL TRANSMISSION AND DISTRIBUTION | $ 13990913 | | | | | | |

DEPRECIATION OF PROPERTY
ORIGINAL COST BASIS AS OF DECEMBER 31, 1983

ORIGINAL COST, BOOK DEPRECIATION, INDICATED ACCRUED AND ANNUAL DEPRECIATION REQUIREMENTS
SUMMARY BY ACCOUNTS

| ACCOUNT NUMBER | DESCRIPTION | ORIGINAL COST | BOOK DEPRECIATION AMOUNT | BOOK DEPRECIATION PERCENT | INDICATED ACCRUED DEPRECIATION AMOUNT | INDICATED ACCRUED DEPRECIATION PERCENT | INDICATED ANNUAL DEPRECIATION AMOUNT | INDICATED ANNUAL DEPRECIATION PERCENT |
|---|---|---|---|---|---|---|---|---|
| | GENERAL PLANT | | | | | | | |
| 390 | STRUCTURES AND IMPROVEMENTS | $ 65075 | $ 6595 | 10.13 | $ 8622 | 13.25 | $ 1764 | 2.711 |
| 391 | OFFICE FURNITURE AND EQUIPMENT | 100140 | 27200 | 27.16 | 35561 | 35.51 | 6915 | 6.905 |
| 392 | TRANSPORTATION EQUIPMENT | 96227 | 24061 | 25.01 | 31465 | 32.70 | 8590 | 8.927 |
| 393 | STORES EQUIPMENT | 8906 | 3567 | 40.05 | 4664 | 52.37 | 437 | 4.907 |
| 394 | TOOLS SHOP AND GARAGE EQUIPMENT | 28775 | 5147 | 17.89 | 6729 | 23.38 | 840 | 2.919 |
| 395 | LABORATORY EQUIPMENT | 18306 | 1979 | 10.81 | 2587 | 14.13 | 517 | 2.824 |
| 396 | POWER OPERATED EQUIPMENT | 15821 | 4537 | 28.68 | 5931 | 37.49 | 829 | 5.240 |
| 397 | COMMUNICATION EQUIPMENT | 7561 | 1891 | 25.01 | 2472 | 32.69 | 512 | 6.772 |
| 398 | MISCELLANEOUS EQUIPMENT | 65343 | 16103 | 24.64 | 21053 | 32.22 | 1990 | 3.045 |
| | TOTAL DEPRECIABLE GENERAL PLANT | $ 406154 | $ 91086 | 22.43 | $ 119084 | 29.32 | $ 22394 | 5.514 |
| 389 | LAND AND LAND RIGHTS | $ 26195 | | | | | | |
| | TOTAL GENERAL PLANT | $ 432349 | | | | | | |
| | TOTAL DEPRECIABLE PROPERTY ANALYZED | $ 15185475 | $ 2834653 | 18.67 | $ 3705987 | 24.40 | $ 502946 | 3.312 |
| | | | 15689,848 | | | | 494356 | 3.276 |

# 1983
# RECONCILIATION OF DEPRECIABLE ELECTRIC PLANT IN SERVICE

ELECTRIC PLANT

| ACCOUNT | PLANT IN SERVICE FERC FORM NO. | TRANSFERRED AMOUNT | DEPRECIABLE PLANT IN SERVICE |
|---|---|---|---|
| 342 | $ 174,126 | $ 85,877 | $ 260,003 |
| 390 | 198,632 | (85,877) | 112,755 |
| **TOTAL** | **$ 372,758** | — | **$ 372,758** |